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A PLEA FOR THE STUDY OF RE-AGENTS IN MICRO WORK.*

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[*Abstract.*]

If any one carefully examines microscopical literature he will find that methods of preparation in the majority of cases are neglected or meagerly described. The mode of obtaining the material, the identification of the chemical dyes used and where they are obtained, their chemical and commercial names, and methods of use are left out. In consequence, another worker in the same line must waste his time finding out how to avoid the same hindrances. The objects wanted by the dental histologist present peculiar difficulties. It is easy to prepare sections of developing teeth and show the hard tissue, but it is doubtful if the hard and soft tissues have ever been properly examined *in situ* in a perfectly natural state, unaltered by re-agents. In order to ascertain the effect and amount of change produced by the treatment necessary in preparations for examination, a wise course would be to take a suite of specimens, put them through a set of hardening solutions, carefully made, then through the various preparations for imbedding and cutting sections, as paraffin, celloidin, freezing, and finally apply the dyes, and on examining the results under the microscope an intelligent opinion could be formed as to the best methods. The question now seems to be, What new dye or agent can I introduce? Instead of, How can I make the best use of those now known? Who does not know the difficulty of preserving objects for a pathological museum, such as a kidney, so as to retain its life-like appearance and the natural color of pathological lesions? Müller's fluid acts well for bulk and structure, but is unsatisfactory for color, the cortical markings being lost as well as the lesions. Chromic acid, even one-fifth to one-fiftieth per cent. solution, is out of the question for material in bulk. Alcohol keeps the specimen nice and white, but causes it to shrink and coagulate, or if a large mass is treated it is not a thorough hardening agent. In imbedding, paraffin has its use for serial sectioning; but what is the right clearing agent? Turpentine is considered less likely to make the specimens brittle; some prefer the essential oils. Some think five to ten hours long enough for penetration; another allows twenty-four or more. The melting point of the paraffin is often wrong, and the temperature of the room while cutting is important. Celloidin. is excellent for cellular tissues, as encephaloid growths, etc., but here a good clearer is needed. Every one disagrees as to what is a thin or thick solution; the proportions should always be mentioned. The manner of arranging a celloidin specimen in the microtome, so as to avoid its "giving," by which we sometimes have a circle with the central part not in, then a section one-fiftieth of an inch thick nothing but the center, which is a matter of much trouble to many workers in celloidin.

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* This paper was received just after the meeting at Madison.

A few years ago the eosin dyes were in great favor. They have great penetrating power and color in a short time, but diffuse too readily and fade easily in most of the mounting mediums.

Eosin is the alkali salt of tetrabrom fluorescein and is produced by the action of bromin on fluorescein. They are used for certain differential work and for blood cells. Directions for using these dyes should specify if the solutions are aqueous or alcoholic; some idea of the shade or intensity should be given. It should be stated if the specimen is to be washed in acidulated alcohol or in water alone, followed by the usual re-agents. There are many varieties of the eosin dyes known by trade names, such as Primrose eosin, yellow eosin, Bengal red, etc. It is a curious fact how one author follows another in recommending the use of acidulated solutions, when the first introducer, Professor Fischer, gives these directions: "Eosin-stained preparations must not be treated with acids. They should be mounted in neutral, or, better, saline glycerin containing one per cent. of sodium chloride, and charged with a little eosin; otherwise the color would diffuse out from the preparation." Again, Fischer prepares his eosin by taking an aqueous solution, adding acid to precipitate the free coloring matter, filtering and dissolving the precipitate in absolute alcohol. This he considers preferable to the potassium salt, especially for Müller hardened preparations. If the potassium salt is to be used the chromic acid must be neutralized by the addition of some alkali. Five authors prefer a one per cent. solution of acetic acid to fix the stain. Sterling uses five per cent. eosin in water, clears with eosinated clove oil, and mounts in Farrant's solution, glycerin, or balsam. Six authors use eosinated alcohol for fixing, and some use both methods.

Why would it not be a good plan to give some of our students a dye to investigate before they take up regular histological work, and by seeing the changes it produces in the tissues they would be warned what to expect.

Those of our readers who desire reliable information as to the chemical composition, character, and trade names and varieties of the more usual coal-tar or carbon dyes will be able to find it in one of two books recently published, viz., "Chemistry of the Organic Dyestuffs," by R. Nietzki, translated by Collin and Richardson ; London : Gurney and Jackson, publishers, 1892; 313 pages; and the second volume of "A Manual of Dyeing," by Kuecht, Rawson, and Loewenthal ; London : Charles Griffin & Co., 1893, 500 pages. This last work is very satisfactory, but is paged continuously with volume one, which relates to the art of dyeing in general, there being 905 pages in both volumes.

PURIFICATION OF WATER BY THE ALUM METHOD.

Max Teich, of the Institute of Hygiene of Vienna, has recently made a study of the effect of the addition of small quantities of alum to impure water for the purpose of precipitating its impurities, and finds that while the method offers no objection from a sanitary standpoint, treatment for at least twenty-four hours is necessary to destroy cholera germs, and that the germs of typhoid fever are not materially affected by it.

W. W. A.